Hardy Fern Foundation

Quarterly

Winter 2017

THE HARDY FERN FOUNDATION

P.O. Box 3797

Federal Way, WA 98063-3797

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Affiliate fern gardens are at the Bainbridge Island Library, Bainbridge Island, Washington; Bellevue Botanical Garden, Bellevue, Washington; Birmingham Botanical Gardens, Birmingham, Alabama; Coastal Maine Botanical Garden, Boothbay, Maine; Dallas Arboretum, Dallas, Texas; Denver Botanic Gardens, Denver, Colorado; Georgia Perimeter College Garden, Decatur, Georgia; Inniswood Metro Gardens, Columbus, Ohio; Lakewold, Tacoma, Washington; Lotusland, Santa Barbara, California; Rotary Gardens, Janesville, Wisconsin; Strybing Arboretum, San Francisco, California; University of California Berkeley Botanical Garden, Berkeley, California; and Whitehall Historic Home and Garden, Louisville, Kentucky.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

THE HARDY FERN FOUNDATION
QUARTERLY
Volume 27 No. 1 Editor- Sue Olsen
ISSN 1542-5517

President's Message

For me the New Year marks the beginning of a new garden. A recent purchase of ten acres is my new canvas to design, plant, and cultivate. My old garden on a quarter acre lot is slowly being dismantled and shifted to a large holding bed and the first plant that was moved was, of course, a fern! A mature clump of *Polystichum acrostichoides*, the Eastern North American native fern commonly called Christmas fern, was hefted into my small pick-up truck along with a handful of other perennials and plants in containers to make the journey. The Christmas fern, although quite common, held special meaning because it is one of four plants that I dug from a wooded lot in southeastern Pennsylvania originally owned by my grandfather and now owned by my parents. True gardens are not just composed of plants, but also serve as living, growing memories to remind us of family, friends and special events. I am happy this was the first fern to be moved. It is the first of many ferns to make this trek along with a multitude of other plants. It will be exciting to see these plants get re-established and bring their personal history with them to my new garden.

The land purchase has also inspired plenty of spore sowing. One I am particularly excited about is three plastic containers filled with a nice crop of crested *Polystichum aculeatum*. This fern is a wonderful reminder of my first fern trip abroad to Germany in 2003 to help scout out a future tour with the HFF and the British Pteridological Society in 2006. During this trip I saw several great collections that are some of the best in the world and was overwhelmed by so many ferns that I did not even know existed. The crested *Polystichum aculeatum* was just one of those, but it stood out as one of the rarest ferns we saw on the trip and I never thought I would have a chance to grow it in my own garden. Fortunately, Sue Olsen, our founder of the HFF, asked for spore from our German hosts and generously shared her sowing successes. Now two plants happily grow and wait their time to be moved to the new property with their prodigy thriving from the spore I sowed. In time, some will join their parents in a hopefully spectacular planting in the new garden and others will be shared with other fern growers to treasure in their gardens.

The act of taking something rare and nearly forgotten and propagating and sharing it so others can experience the joys and challenges of growing it strikes at the heart of why the HFF was created. Some of these tiny sporelings will be donated to a new program the HFF is creating to introduce and make available rare and uncommon ferns to our members. You can participate in this program as well by collecting spore and sharing it with the HFF spore exchange and by growing spore from the exchange and sharing extra plants with the HFF.

I hope the rest of your winter is mild and spring is early!
All the best,

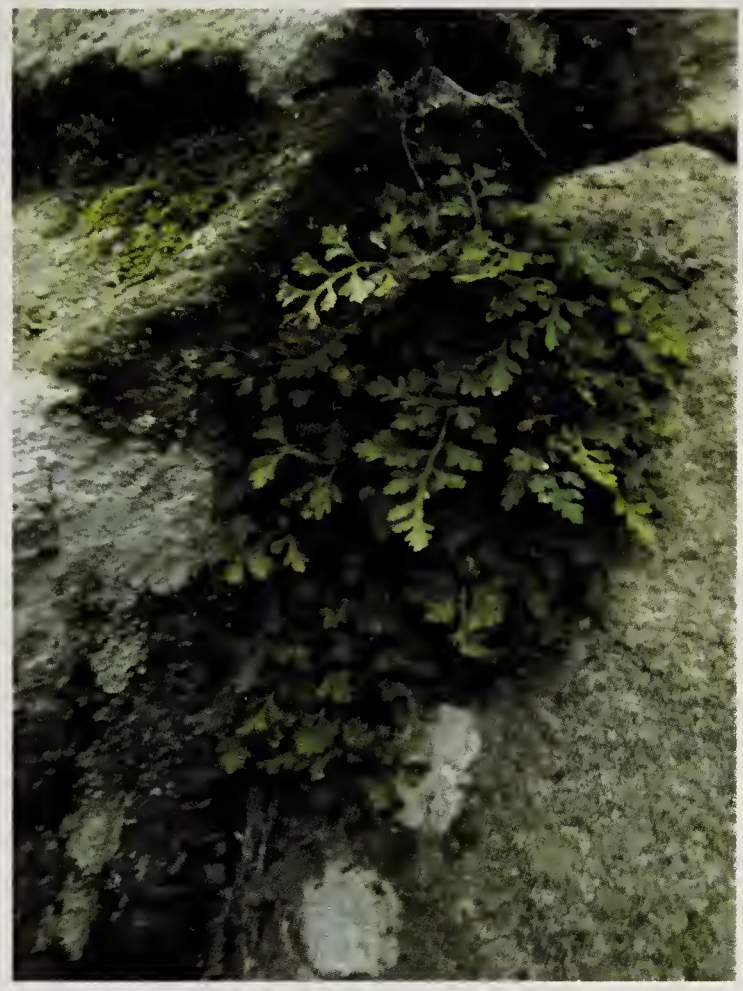
Richie Steffen
Hardy Fern Foundation President

Asplenium montanum

Mountain spleenwort

James R Horrocks

Salt Lake City, UT



The genus name supposedly refers to its reputed capability to cure disorders of the spleen and liver but the literal translation is "without a spleen". It is of ancient derivation going back to the Greeks. The species epithet refers to it being "of the mountains". It is a small rather delicate fern with bluish-green fronds that grow in tufts, frequenting crevices of rocks that promote acidic conditions such as sandstones, shales, igneous, and metamorphic strata. This species is native to the eastern United States from Connecticut down through Pennsylvania and West Virginia east to Ohio and south to the uplands of Alabama and Georgia with isolated colonies in Missouri and Indiana. It is mainly concentrated in the Appalachian Mountains but is rare in New England. Rush mentions that it is found in Europe and Asia but Wherry suggests that it was introduced into Europe from North America. As far as Asia is concerned, this author could find no mention of this species in any literature from China or Japan. Nor is it found in the Himalaya.

Asplenium montanum may bear a faint resemblance to *A. ruta-muraria* and also to *A. adiantum-nigrum*, both calciphiles preferring limestone outcrops. If it grew in Japan it could be easily confused with *A. sarelii*. Very young *Cystopteris fragilis* specimens could be mistaken for it, but *Cystopteris* has true pinnules, a more scaly stipe, and oval sori rather than linear. *A. montanum* has hybridized with a number of other species in the Appalachian *Asplenium* complex including *A. platyneuron* to form *A. x bradleyi*, a tetraploid, and also with *A. (Camptosorus) rhizophyllus* to produce the tetraploid *A. pinnatifidum*, its fronds occasionally proliferous. It has back-crossed with *A. pinnatifidum* to give us *A. x trudellii*, a triploid.

Description: The short creeping rhizomes are ascending and occasionally branching. The stipes are one-third to one-half the length of the fronds, dark brown to even purplish-black at the base but quickly becoming green above, and rather smooth with few narrow scales mainly at the base. The fronds are three to six inches long, occasionally to eight inches, and are evergreen, displayed in an arching manner. They are narrowly triangular to lanceolate in outline, widest at the base, the lower two pair of pinnae bipinnate, then becoming once-pinnate to pinnatifid upward toward the apex. The pinnae are distinctly stalked and are lanceolate to ovate-oblong, appearing sub-opposite each other, rhombic

or diamond-shaped and serrate on the margins as are the pinnules. The rachis is flat with sparse hairs. The sori are characteristically linear as are the fragile indusia which are a pale translucent tan, somewhat erose and often concealed by the sporangia when mature. This species is diploid.

Culture: Again we have some disagreement as to whether *A. montanum* responds to cultivation. It has been successfully grown in terraria and in acidic pockets of soil with acidic rock chips according to Lellinger. Mickel says that its ease of cultivation is "moderate", adding that it must be tucked tightly into rock crevices, while Sue Olsen tells us: "it is not eager to be introduced to garden culture." Wherry is much less optimistic: "Owing to its specialized habitat, practically impossible to grow in a garden." If you can possibly follow suggestions for culture to the letter, you might have a go with it. Then again, success may depend on simply sheer dumb luck. It is a pretty little thing and certainly a charming addition in any rockery.

References:

Cobb, Farnsworth, Lowe, 2005, *A Field Guide to Ferns of Northeastern and Central North America* (2nd edition) Houghton Mifflin Co., New York

Jones, David L., 1987, *Encyclopaedia of Ferns*, Timber Press, Portland

Lellinger, David B., 1985, *A Field Manual of the Ferns and Fern Allies of the United States and Canada*, Smithsonian Institute Press, Washington D.C.

Mickel, John, 1994, *Ferns for American Gardens*, Macmillan Publishing Co., New York

Olsen, Sue, 2007, *Encyclopedia of Garden Ferns*, Timber Press, Portland

Rush, Richard, 1984, *A Guide To Hardy Ferns*, British Pteridological Society, London

Wherry, Edgar T., 1961, *The Fern Guide*, Double Day, New York

Welcome New Members!

Fran Calandra	Martha Meek
Cheri Casey	Margaret Ralph
Kay Dye	Robyn Ricks
Donna Gallagher	Brian Silkworth and Bill Colter
Howard Goldberg	Deborah Smith
Mollie Groendyke	Janice and Randy Stone
Nancy Huston	Brenda Townes
Pam Johnson and Gary Sloan	Anna Tyszkowska
Thomas Kracht	Emma Yokurka
Lynda Mapes	Marie Weiler

Climbers and Twiners ~ Some Ferns are Touchy

Joan Eiger Gottlieb ~ Pittsburgh, PA

The word "fern" evokes an image of a woodland, ground-dwelling plant, with large, pinnate (divided) foliage in a graceful cluster. Here, in western Pennsylvania that might be a Christmas fern (*Polystichum acrostichoides*) or the more feathery-fronded, tripinnate evergreen wood fern (*Dryopteris intermedia*). Digging deeper into our local fern inventory there are species that pop out of rock crevices (purple-stemmed cliffbrake, *Pellaea atropurpurea* and maidenhair spleenwort (*Asplenium trichomanes*). Others perch on rock ledges (walking fern, *Asplenium rhizophyllum* and rock polypody, *Polypodium virginianum*). In the southern United States resurrection fern (*Pleopeltis polypodioides*) festoons the horizontal branches of oaks and magnolias as an epiphyte. Farther south, in Mexico and Central America, fork ferns (*Gleichenella* and related genera) produce long (30', 9m), complexly branched fronds that ramble, thicket-style, over open forest slopes.

Few of us, however, think of ferns as true climbers or twiners, starting life on the ground, but maturing with long-growing fronds or long-creeping rhizomes that "seek out" and cling to upright supports (trees, shrubs, poles), climbing upward to a "place in the sun." The climbing "urge" has, it seems, evolved independently in four separate fern families.
Lygodiaceae (*Lygodium*), **Blechnaceae** (*Salpichlaena, Stenochlaena*), **Dryopteridaceae** (*Lomagramma*, *Polybotrya*, *Bolbitis*), and **Lomariopsidaceae** (*Lomariopsis*).[1]

Lygodium[2] is a widespread genus in the tropics with about 40 named species. Here in North America the endemic Hartford fern (*L. palmatum*) is our only native climbing fern. It is an uncommon and thrilling find on poorly drained, acidic substrates, including abandoned logging sites and moist coal tailings. There are two basic techniques used by climbing ferns. *Lygodium* is a leaf twiner; its fronds can be up to 10' (3m) long, with active tip meristems (cell generating zones) that are indeterminate (do not mature) unless damaged or until there is a transition to spore production on constricted, late-season, fertile pinnae. In the spring short-creeping, underground rhizomes push up a succession of delicate fronds whose rachises have long-spaced internodes between nubbin-size, immature pinnae. The pinnae remain tiny and undeveloped, reducing the weight strain on the fiddlehead "search" tip as it "seeks," contacts, and coils around nearby upright structures. In this way the rachis secures late-expanding, palmately-lobed pinnae to the support while the frond tip continues growing,

repeating its "find and attach mission." If no vertical support is within reach, rachises will sprawl over the ground and twine around themselves or sister fronds (see photo page 5). So tenacious is this clasping behavior that in Florida, where Asian climbing fern (*L. microphyllum*) was introduced as an ornamental in the 1960s, it has spread by spores and inserted itself aggressively into the trees and shrubs of cypress swamps. This invasive, alien, climbing species can, and does, smother whole communities, forming a conduit for devastating canopy fires - a cautionary tale, even for fern lovers.

Salpichlaena volubilis (Blechnaceae) is another climber with twining leaves. In primary forest at Braulio Carillo National Park, Costa Rica,[3] this stunning, neotropical fern produces sturdy, ground-based rhizomes and vine-like, bipinnate fronds with rachises that fasten their pinnae to the bark of nearby tree trunks. Pinna by pinna the fern makes its way into the bright light of the canopy. There it can do enough photosynthesis to "afford" fertile fronds with conspicuously narrower pinnules bearing linear sori along reinforced, central veins, a common pattern in the Blechnaceae.

The remaining genera of climbing ferns do it with their rhizomes. *Stenochlaena palustris* (also in the Blechnaceae) is a paleotropical species that is a favorite in university greenhouses and city conservatories across North America (see photo left and below.) Phipps Conservatory, here in Pittsburgh, has an imposing specimen with strong, branching, green rhizomes that grow straight up through the rough leaf bases of a large tree fern. Its pinnate fronds are dimorphic, but I am still waiting to see a skinny, fertile frond emerge on this expert climber. Emerging leaves of *Stenochlaena* and *Salpichlaena* share a familial copper color, making them show-stoppers everywhere.

Lomagramma (one species in the American tropics), *Polybotrya* (neotropical genus of *ca.* 35 species - 2 found during a Costa Rica fern study trip [3]), and *Bolbitis* (pantropical genus with *ca.*15 species in the New World tropics) are nested in the large family Dryopteridaceae. *Lomariopsis* (namesake genus of the Lomariopsidaceae - with *ca.*15 species in the neotropics - two seen in Costa Rica[3]) rounds out the seven genera in four fern families that have at least one genus and species that twines or climbs. They have a common gestalt - long rhizomes or rachises that clamber up supports while producing well-spaced, dimorphic vegetative and reproductive fronds or pinnae. These ferns have been described

as hemiepiphytes. They start life as sporelings, rooted in the ground, and gradually develop adult form and upwardly mobile "ambition," aiming for the canopy or at least the better light needed for spore production. (True epiphytes do not touch ground, growing from spores or seeds that land on the branches of woody plants from which they derive physical and sometimes nutrient support.)

The big question about climbers and twiners is "how do they do it?" Most animals, many simple protists, and some bacteria can relocate ("get up and go") to favorable locations. They have muscles, flagella, and other specialized mobility structures or tissues. Plants, by contrast, are attached or rooted in place and can respond only by growing toward (positive response) or away from (negative response) various environmental stimuli. Such growth responses are called **tropisms** and are based on **differential cell elongation** (greater on one side than another). Phototropism is the most familiar; we have all seen plants bend toward the light coming from one side on a window sill. But plants also respond to gravity (geotropism), water (hydrotropism), and the daily movement of the sun (heliotropism - think sunflowers).

Twining and climbing are directional growth responses of a plant organ to a contact stimulus and are examples of **thigmotropism** - from the Greek *thigmo* (touch) and *tropism* (growth response). When special parts of plants (the tip of a rachis or rhizome of some ferns or the tendrils of some angiosperms) touch a solid object, a cascade of events is unleashed. These include, in part, the release of auxins - growth hormones like indole-acetic acid - from meristems, and the redistribution of these hormones to cells on the non-contact side. There the hormones act as gene promoters that signal increased cell permeability to water, driving comparatively more cell elongation on the non-contact side. Result? - the bending, coiling, twisting, and grasping growth responses of twiners and climbers. How cunning and touchy these plants are!

Acknowledgement and References

All photos courtesy of Joan Eiger Gottlieb

[1]This article was inspired by a recent, personal, and much appreciated tutorial on the taxonomy of climbing ferns from Dr. Alan R. Smith, Univ. of California, Berkeley, July, 2016.

[2] Gottlieb, Joan E. *Lygodium palmatum* - a fern obsession, *Hardy Fern Foundation Quarterly,* Winter, 2008.

[3] ibid., Fern riches in Costa Rica, *Hardy Fern Foundation Quarterly,* Summer, 1999.

The Fern Tour of Japan – November 2-12, 2016

Daniel Yansura

Pacifica, CA

Introduction

2016 Horticultural Tour:
The Ferns of Japan

This trip was a follow up to the 2014 tour, and it was just as exciting as the first visit. Most members of the first tour returned for the second; this included large contingents from the Seattle, Washington area and England, as well as a smaller group from California. The 2014 tour was an official fern foray for the British Pteridological Society (BPS) and the Hardy Fern Foundation (HFF), and the trip was written up in detail and published in the BPS Bulletin and the HFF Quarterly. The 2016 tour, however, was not formally sponsored by the BPS and no official write-up is expected. My goal here, then, is to provide that fern-centric daily view of what we saw and experienced. An alternative and refreshing view of the tour is also offered by Daniel Mount in his Garden blog, Flora Japonica: (www.mountgardens.com).

The 2016 fern tour focused on two general areas of Japan's large island of Honshu, one in the north and one in the south. The northern leg was centered near the cities of Fukushima and Sendai. Daily bus rides took us into the surrounding mountains to look for ferns and of course offered us some wonderful scenery, not unlike the mountainous scenery we might see in our western United States. Some of these sites had geothermal activity, and while not affecting the fern flora, provided some wonderful onsens, or public hot springs, at our resorts in the evenings. The southern leg of the tour was on the Kii peninsula, a large mountainous area south of Kyoto that we also visited on the 2014 tour. This is a beautiful, relatively undeveloped region and the site of the Kumano Kodo pilgrimage routes and shrines. The high rainfall here (~158 inches/year) produces a temperate rainforest, where mosses and epiphytic ferns cover trees, rocks, and even concrete objects. The northern areas around Fukushima and Sendai are listed as USDA hardiness zones 8a and b, similar to the Seattle, WA area, while the southern Kii peninsula is in zone 10a, more in line with coastal California.

The 2016 fern tour, like the one in 2014, was sponsored by Japan Specialized Group Tours, and we were all delighted to have Kazuo Tsuchiya and Asher Ramras as our guides again. Additionally, the Nippon Fernist Club suggested good fern sites for the tour and various members accompanied us on all of our forays, providing invaluable help with fern identification. *To be continued in the Spring issue.*

Of ferns and fan dancing

Jo Laskowski

Seattle, WA

Wednesday, July 27th, 2016 was kind of a big day for the Hardy Fern Foundation. The Northwest Horticulture Society, another equally local and equally venerable non-profit organization, joined with us to present a fern symposium. Old-timers might recall that NW Hort and HFF both have their origins in some of the same people, and used to do a lot of partnering for events.

Two locations on a small, rural island a stone's throw from megalopolis Seattle were graciously volunteered for the symposium. Pat Riehl, HFF board member, would host at her Vashon Island stumpery, established in 2008 and looking good. John van den Meerendonk, immediate past president of HFF, would contribute his expertise at Pat's also, tackling the complex task of fern identification and vocabulary. At Mary and Whit Carhart's garden, Richie Steffen, current president of HFF, would demonstrate construction of a fern table, generously sharing tips distilled from his experience.

The group was split into two, with one group going to Pat's for the morning session, and the other one to Mary and Whit's. At the end of the morning session, everybody would gather at the Carhart's for a box lunch. Ferns would be for sale there, and oddly enough, some of them would be the same ones used in the fern table... After lunching and shopping and wandering the Carhart's stunning hillside garden, the two groups would swap locations, and Pat and John would give their second session and Richie would make a second table.

I went to the morning session at the Carhart's. First fern table of the day for Richie. We sat outside, on a cooperatively gorgeous day. A flat, stone slab sat on sawhorses. There was a bag of soil, a huge pile of wood and a gaggle of ferns and perennials.

The soil mix was a special blend of compost, bark, pumice, and micronutrients. The wood pieces were eye-catching shapes that Whit had culled from the driftwood piles on Vashon Island beaches, polished silvery and ghostly white. Some had fallen from the many trees on the property, and were weathered and mossy.

Richie started talking. (see photo right) The first piece of wood hit the table. He would talk and add soil and stuff plants and rearrange and add wood and answer questions. I listen to a lot of jazz and blues. There's almost always a stray song threading its way through my gray cells someplace. As I watched and listened, King Curtis popped into my head. He was a blues-playing sax man, a virtuoso with riffs and rhythm, active in the 1960's. He

famously wrote and played 'Memphis Soul Stew'. Of course, Richie couldn't hear it, but he was keeping good time.

Today's special is Memphis Soul Stew
We sell so much of this, people wonder what we put in it
We gonna tell you right now
Give me about a half a teacup of bass

Richie was working on a large stone slab set on sawhorses. It's suggested to use a base no smaller than 2' x 2', or the table dries out too fast. Stone holds water better than wood does, and sidesteps the issue of the table disappearing from underneath you some day and forcing a renovation that you might not be happy about undertaking. The first wood pieces created a foundation for more soil and more wood to follow.

Now I need a pound of fatback drums

I was thinking that a table would be restricted to small ferns, so it was surprising to learn that some rather large ferns could be used. *Polystichum* x *dycei* (Dyce's holly fern), which matures at about 3', does well, as does *Osmunda regalis*, the royal fern, which can top out at 6'. On a table, the royal fern can stay small.

The structure started rising. *Blechnum spicant* (deer fern) anchored the base. *Athyrium niponicum* 'Apple Court' (Apple Court Japanese painted fern) arched out coyly over the edge of the table. More soil, more wood. *Dryopteris filix-mas* 'Parsley' (Parsley male fern) and *Athyrium otophorum* (eared lady fern) and *Arachniodes standishii* (upside-down fern) took their places. All of these ferns are worthy of the close attention that being at eye-level would bring, especially the upside-down fern with its visually complex tri- and quadripinnate pinnae.

Now give me four tablespoons of boiling Memphis guitars

From the very first, little perennials were incorporated. Pretty soon the composition included *Saxifrage* spp, *Ypsilandra tibetica*, *Hosta* 'Hush Puppy,' variegated *Arabis* varieties, and don't forget *Acorus gramineus.* Almost any dwarf hosta or small groundcover would be a good choice.

This goin' taste alright
Now just a little pinch of organ

After soil is stuffed in all the holes, moss is the binder, liberally tucked in between the pieces of wood and softening the edges of the table.

Now give me a half a pint of horn

The topper for this creation was a small *Pieris* cultivar. Those cascading racemes of flowers would lend an elegant note.

Place on the burner and bring to a boil
That's it, that's it, that's it right there.
Now beat, well.

In order to move a table you can wrap it with fishing line. After a couple of years the line can be removed, at which point fern roots will be grown into the wood and help to bind the assemblage together. In terms of maintenance, tables will do best if treated like a fuchsia basket, with regular water and heavy fertilizer. Heavy fertilizer is especially important because the wood pulls nitrogen from the soil as it breaks down.

In the long run, a properly assembled fern table will last about 3 to 5 years. At that

point some editing can be done to refresh the balance. Plants that have become too large can be replaced, failures can be jettisoned, your latest infatuations can take center stage.

When lunch wrapped up, Pat guided a string of cars back to her place for the afternoon session. We nosed around her stumpery, eyeballing the fern collection and enjoying the overwhelming sense of serenity that comes as you drop down into the gulley that contains it. She's got a well-established group of Tasmanian tree ferns, *Dicksonia antarctica,* in the ground. And she's diligent about their winter protection, wrapping the trunks and tying up the fronds to protect the crowns. *Dicksonia antarctica* is on the edge of its hardiness here in the Pacific Northwest—her hard work is evident in this extraordinary outdoor tree fern collection.

After our walkabout we settled in for John's presentation. As we entered Pat's house we filed past a long table heaped with fern fronds.

We had a lapful of handouts—a syllabus, Classification of the Ferns, Typical Fern Life Cycle, a great little sheet with silhouette drawings that clearly showed what simple and pinnatifid and pinnate and pinnate-pinnatifid and bi- and tri-pinnate and bipinnate-pinnatifid fronds looked like. And line drawings of sori patterns, fern scales and hairs, rhizome habits, stipe bundles. I *love* line drawings, really almost prefer them to photographs as a learning tool. Fern Identifying Characteristics, Fern Genus Characteristics, Ferns for Northwest Gardens—all were part of the pile of material that slithered off laps and did double duty as makeshift fans in the warm afternoon.

John warmed to his topic and pretty soon he was moving around the room, waving fern fronds to illustrate his points. Pat stood at the ready, bringing requested specimens as needed.

Woodwardia unigemmata: chain-like **sori** pattern and red new growth. A **sorus** is a group of the small structures that ferns use to launch their spores. These groups of **sori**—plural of **sorus,** and much easier to say than "soruses"—occur in distinct patterns, and these patterns can help in identifying a fern to the genus level.

Red emerging fronds in the spring and summer is a desirable characteristic among fern enthusiasts. It's a beautiful trait. Some ferns and other plants do this, and what you're seeing is the red pigment that's always present in a frond or plant leaf but usually masked by green chlorophyll. New growth is very tender, and the chlorophyll especially so. Until the chlorophyll has matured and hardened off, it's protected with red pigments that slowly recede to leave a fully mature, and usually green, fern frond or plant leaf.

Adiantum aleuticum: shiny black **stipes** and **palmate blade.** The **stipe** is the portion of stem between the place where it emerges and the bottom of the leafy part of the frond. The part of the frond above the **stipe**—the leafy part—is called the **blade**. **Blades** take on many different shapes, and a **palmate blade** is arranged into divisions that resemble the fingers of a hand.

Asplenium scolopendrium: **entire** blade. There are words to describe the outline of a frond. **Entire** means that there are no breaks of any sort along the margin of the frond.

Blechnum spicant: **dimorphic** blades. Some ferns put out two different looking fronds. One kind is vegetative, and the other is fertile. The appearance of the two kinds is very different. If a fern does that, it's said to be **dimorphic.**

Adiantum venustum: creeping **rhizome.** The **rhizome** is the stem of a fern. New fronds grow out of it, and these fronds can be spaced closely together, or distantly spaced.

If the **rhizome** is running horizontally through the soil, that behavior is called creeping. A fern can be short-creeping or long-creeping.

Matteuccia struthiopteris: dimorphism and **ascending** rhizome. Sometimes a rhizome grows vertically up into the air. Ferns that appear to be growing a trunk and growing taller over time are said to be **ascending.**

Polystichum munitum: circular **indusium.** Groups of sori are protected under or in small structures. These structures are called **indusia,** the plural of **indusium.** The shapes of the **indusia** can help you diagnose to the genus level.

Dryopteris sieboldii: palmate blade and leathery texture. *D. sieboldii is* most unfern-like in appearance. Besides its distinctively shaped frond—palmate—it has a leathery texture to it, not what most people associate with ferns.

Osmunda regalis: fall color. The very thin foliage of the royal fern turns a warm, golden brown as it dies back in the fall. For the designers among us, this can be a positive attribute in a seasonal garden.

Polystichum setiferum 'Plumoso-multilobum': **quadripinnate.** Besides being an intimidating mouthful, this soft shield fern carries very visually complex fronds. (suitable for fan dancing!) The system used to describe the increasing number of divisions in a frond uses the words one, two, three, or four pinnate, or once-, twice-, thrice-, or **quadri-pinnate.** Also bi- and tri-pinnate, if you're keeping track.

To the question of why we don't get overrun with sporeling ferns we learned that bacteria are tremendous consumers of spores. Disturbed areas are good areas for fern establishment. After Mount St. Helen's—one of Washington State's active volcanoes—blew its top in 1980, one of the first observed plants to return to the ghostly, moon-like landscape was a fern.

We learned that among those ferns that are called xeric, or dryland, we find **apogamy** to be a very common reproductive method, because it doesn't require water for the process. **Apogamy?** Oh, that's when a fern bypasses sexual fertilization and goes straight to cloning itself. Since water is required to ferry fern sperm to fern eggs, and that can be dicey and unpredictable in a dry environment, this strategy saves the fern from scattering (or wasting) its spores.

The swishing was slowing down. Eyes were glazing with everything seen and heard. Ferries were calling for those heading off the island. The exciting day was winding down, warm and glowing as senescing royal ferns in the fall.

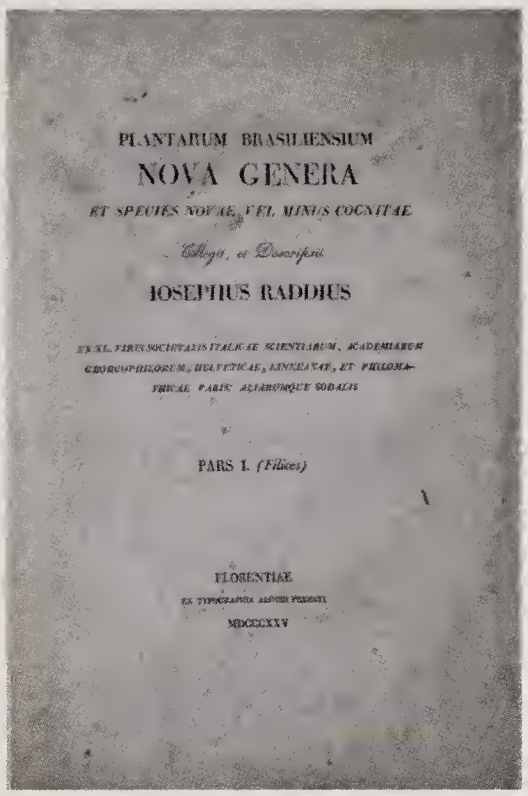
Mark your calendars for the
2017 Northwest Flower and Garden Show
February 22nd ~26th
Be sure to stop by our booth!

An introduction to the history of fern books in the Americas

Martin Rickard

Tenbury Wells, England

Despite the Americas being known as `The new world', remarkably, the first fern book ever published was an American fern flora, *Les fougeres de l`Amerique*. It was published in 1705 and compiled by Charles Plumier, botanist to the king of France. It is a magnificent book. The page size is folio and comprises 192 pages of text, in French and Latin, and 170 full page uncoloured plates. All drawn by Plumier and while somewhat stylised, all are recognisable by botanists today. By comparison the first European book, *Filices Britannicae*, was not published until 1785 by James Bolton. Unfortunately Plumier could have titled his book Les fougeres de Guadaloupe, because just about all the ferns described are from the French West Indies. While some would occur in Florida it was in no way a fern flora of the United States. Perhaps the slightly misleading title explains why the book is fairly well represented in US libraries. The BPS/HFF group touring Texas in 2007, organised by Naud Burnett, were shown the copy in the B.R.I.T. library in Fort Worth.


PLANTARUM BRASILIENSIUM

NOVA GENERA

ET SPECIES NOVAE, VEL MINUS COGNITAE

Collegit, et Descripsit

IOSEPHUS RADDIUS

EX XL. VIRIS SOCIETATIS ITALICAE SCIENTIARUM, ACADEMIARUM

CHOROPHILORUM, HELVETICAE, LINNEANAE, ET PHILOMA-

THICAE PARIS' ALIARUMQUE SODALIS

PARS I. (Filices)

FLORENTIAE

MDCCCXXV

Title page of Raddi

After Plumier there was a long wait for another American fern book. Articles and floras mentioning American ferns had been written but the next book solely on ferns of any note did not appear until 1825. This was *Plantarum Brasiliensium*, Pars. 1 (Filices), by Iosephus Raddius. It is given as Part 1 on the title page but no other parts ever appeared. The format here was similar to Plumier`s. Folio sized with uncoloured plates, although Raddius did not draw them himself. In total there are about 105 pages of Latin text and 84 plates. (see photos right)
Other national monographs appeared sporadically over the next 55 years. The first was a small octavo book with no illustrations, *Synopsis plantarum cryptogamicarum ab Eduardo Poeppig in Cuba et in America meridionali collectarum* by Gustavo Kunze, 1833. There are 111 pages in Latin. One extra page on flowering plants makes the total 112.

Sample plate from Raddi, 1825. Plate 29 - *Polypodium hirsutulum* (left), *Polyodium glaucum* (right).

Nine years later the first book on Mexican ferns appeared. This *was Memoire sur les fougeres du Mexique* by Henri Galeotti and Prof. M.Martens, first published in 1841, and available as a book in 1842. Considering the richness of the Mexican fern flora this is a fairly slim volume with 99 pages of text in French and 23 plates illustrating 39 species. Somewhat surprisingly the next book to appear also covered Mexico. It was *Mexicos bregner* by Frederick Leibmann, published in 1849 but conveniently reprinted by The New York Botanical Garden in 1987 under the expert guidance of John Mickel. The original book was octavo and ran to 174 pages of text in Danish. There are no illustrations. The reprint includes a full translation into English.

Front cover of Brackenridge

In 1854 Brackenridge published *United States exploring expedition. During the years 1838,1839,1840, 1842, 1842 under the command of Charles Wilkes, U.S.N. Vol. XVI. Botany. Cryptogamia, Filices including Lycopodiaceae and Hydropterides*. Issued to two volumes, a quarto text volume of 357 pages in English and a second folio volume of 46 plates published in 1855.This very interesting work covered new species recorded from islands in the Pacific Ocean, including a few from Hawaii. (see photo right)One would think that two books on Mexican ferns in 9 years would signal a rest, fortunately it did not! In 1857 A.L.A.Fee published his *Catalogue methodique des fougeres & des Lycopodiacees du Mexique* as Memoire 9. I have not seen a copy of this but it had only 48 pages of text in French and no illustrations. Quarto size.

Fee`s Memoire 11 was *Histoire des fougeres des Antilles*. Published in French about 1866, this was his last Memoire. It ran to 164 pages of text in French and 34 uncoloured plates. Fee dedicated this volume to Plumier.

Sample sheet of Jamaican ferns

Fee published one other book on the Americas but it was not one of his Memoires. It was the *Cryptogames vasculaires du Bresil* published in two volumes. Volume 1(1869) had 268 pages in French plus 78 plates. Volume 2(1872-73) had 115 pages of text in French plus another 30 plates. Quarto size.

During the period while Fee was active an obscure article listing ferns in Cuba and Venezuela was issued in Mem. Acad. Amer. Scient.et Artium, N.Ser.Vol VIII by Daniel Eaton in 1860. I include it here because it was issued separately in 1861 as a 25 page book. It was titled *Filices Wrightianae et Fundlerianae* and written in Latin.

Up to 1873 we had had two books on the ferns of Brazil, two on the Lesser Antilles, two on Cuba, three on Mexico, one on Venezuèla and one on the Pacific Islands, yet none on the United States. Certainly there had been a lot of activity in journals but I can find no evidence for any book published on US ferns.

In the 1870s folders of Jamaican ferns were produced. These were done anonymously. (see photo right) Ferns were mounted on printed sheets with several species to a sheet, none named. Sample seen has been dated 1877 on inside front cover. Many private Jamaican herbaria bound in book form also exist from the middle of the nineteenth century. Again in Jamaica large numbers of fern doyleys were produced from the 1860s (see fascinating article by Michael Hayward in *Pteridologist*,5, pps 411- 415).

The first US pamphlets and books solely studying ferns that I can find were published from 1873 onwards. The first was Robinson with *Checklist of the ferns of North America,* 1873, a 13 page pamphlet. Then from 1877 to the end of the decade several fern works were issued. The time-line of issues is not totally clear but it seems the following order is probably correct:

1877 or 1878 - Daniel Cady Eaton (see photo right) issued *Ferns of the Southwest: an account of the ferns which have been collected in so much of the territory of the United States of America....* Unfortunately this was omitted when Nigel Hall and I wrote *Fern books* (Published by the British Pteridological Society, 2006) because it was not a stand alone fern book. On refection we should have included it. I have not seen a copy of this Eaton but by all accounts it was issued as an extract from Volume 6, US geographical surveys west of the 100th meridan. Pagination was iv, 299 - 351.

1878 - John Williamson published the *Ferns of Kentucky*. It was probably therefore the first complete American fern book. At the end there is an advertisement for the *Ferns of North America* by Eaton. The text reads the `subscription price will be $1 per part'. Notice `will be', therefore it is possible parts of Eaton were not available in 1877 as tentatively suggested below. Williamson`s book was octavo size and ran to 154 pages plus 60 etchings and woodcuts.

Plate 36. From left *Asplenium trichomanes, A.viride* and *A.parvulum*. Notice the plumose form of *Asplenium trichomanes*.

The ferns of North America by Daniel Eaton (?1877 or 1878 for first parts) 1879 and 1880 for the completed two volumes. Publication dates for this magnificent book are difficult to sort. (see photo right) The first parts may have appeared in 1877. Unfortunately I have not seen any dated parts but the publishers promise is to produce a new part every two months or so, however the parts were mostly issued in pairs. Perhaps in reality it was two parts every two months? We know volume one complete was certainly available in 1879 therefore parts would have been issued in the previous 15 to 30 months, depending on what constitutes a part the

earliest publication date would be 1877 or 1878. That is not the end of the confusion. COPAC, an internet search engine of UK libraries, includes a copy of only 7 parts at Cambridge University giving the dates of 1878. Furthermore they give the publishers as Hardwick and Bogue; London! This is very strange. Was the book really initially published in London a year before US publication? Bogue`s catalogue of works on natural history, 1882 does not list it. It is probably safest to give publication dates of 1879 and 1880 for each complete volume published by S E Cassino.

Plate 11 of *Adiantum pedatum* from Fern etchings, 1879.

Eventually at least 27 parts were issued, volume one, published by S E Cassino, appeared in 1879 and the project was completed with volume 2 issued in 1880. It was available in a large quarto format. The two volumes contained 80 magnificent colour plates produced by Emerton and Faxon and 682 pages of text, in English. The wait for a good book on the ferns of the United States was over! This book was then, and probably still is, one of the finest fern books produced anywhere in the world. Some of the, presumably, spare plates were recycled in *Beautiful ferns*, a later publication by Eaton which appeared in several issues from 1881 to 1892. Eaton also published A *Systematic fern list* in 1880, this was little more than a pamphlet only running to 12 pages.

Covers of Williamson`s two books side by side, 1878, 1879

1879 Williamson put out an updated version of his *Ferns of Kentucky*, now called *Fern etchings*, which covered the ferns indigenous to the northern United States and Canada. (see photo right) My copy is titled `Second edition' this might refer to *Ferns of Kentucky* being the `First edition'. This issue was on larger sheets, probably quarto, and contained 65 etchings, all beautifully executed. Text pages are not numbered. In the preface he thanked Eaton, this was therefore probably issued late in 1879. He dedicated the book to Davenport.

From 1880 the flood gates opened and numerous fern books appeared particularly in the US. It seems that most if not all, states have their own flora these days.

Richie's Ireland – United Kingdom Travelogue

Richie Steffen

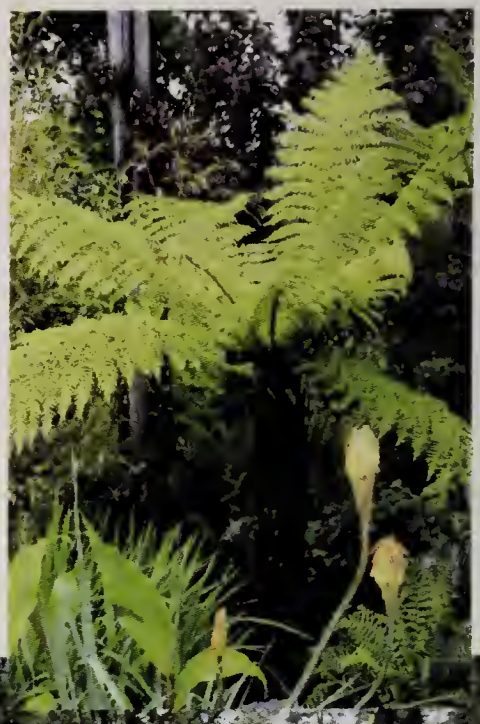
Federal Way, WA

June – July 2016 ~ PART 2

June 28, 2016 Tuesday – Kells Bay Gardens, Ring of Kerry, west of Killarney, Ireland

Our first stop of the day was Kells Bay Gardens. The gardens are nestled into the hillside above the North Atlantic Ocean, taking advantage of the moderating temperatures of the sea. Kells Bay Gardens opened to visitors in 2006, but dates back to the Victorian Era. The Gardens contain one of the finest collections of Southern Hemisphere plants in Europe. Purchased in 1837 by Rowland Blennerhasset, the house was built and then the garden started by his grandson after his death. Now owned by Billy Alexander, an avid plantsman and collector who is working on reviving the old garden and actively adding many new plants with a special interest in ferns, especially Southern Hemisphere *Blechnum*!

Billy took us around the garden, entering in through the walled garden where there were several stands of *Luma apiculata*, Chilean myrtle, with beautiful smooth orange bark. We have two specimens of this at the Miller Garden that are just now reaching the stage of showing off their lovely bark. The walled garden is filled with many rare and marginally hardy trees and shrubs as well as some impressive specimens of *Blechnum*, including *Blechnum tabulare*, *Blechnum chilense*, *Blechnum novae-zelandiae*, *Blechnum fluviatile*, and *Blechnum penna-marina.* Walking through the wall garden we enter one of the most spectacular areas in the garden, the tree fern forest. Hundreds of mature tree ferns have naturalized in the garden creating a site more expected in Australia or New Zealand than Ireland! Primarily *Dicksonia antarctica*, the Tasmanian tree fern, weaves between mature oaks and ash covering the slopes.



Next we visited the behind the scene production area which was astounding. It was loaded with large specimens of rare ferns and interesting trees and shrubs, including a wall lined with 8 to 12 foot tree ferns alternating with *Wollemia nobilis*, the rare Australian Wollemi pine. Many of these plants were being sold for landscape jobs or the garden's sales area. I was filled with plant lust and wished there were an easy and reasonable way to import these into the US.

As we walked through the garden the wild areas seamlessly blended with planted beds and old mature plantings were being complimented with new additions. Several species of tree ferns were planted throughout the garden, with several starting to naturalize in the mild climate. The highlight of the Gardens (besides the tree ferns) was the lush and plentiful displays of Southern Hemisphere *Blechnum* ferns. Massive drifts and self-sown plantings of these rare ferns were unforgettable. Also of particular interest was an

extremely rare and difficult to grow filmy fern, *Leptopteris superba*, the Prince of Wales fern, growing to perfection in a wet seep under the sheltering fronds of a large *Blechnum novae-zelandiae*. (see photos, bottom page 18)

After Kells Bay Gardens we continued our journey following the Ring of Kerry highway. The Ring of Kerry is a scenic drive around the Iveragh Peninsula in southwest Ireland's County Kerry. The 111 mile circular route takes in rugged and verdant coastal landscapes and rural seaside villages and returns to Killarney. A favourite tourist road we spent a considerable amount of time following or being followed by a sightseeing bus which generally hogged more than its share of the road. I am grateful to be driving the same way as the buses rather than trying to dodge them coming toward me. Near Killarney we stopped at Torc Waterfall in the Killarney National Park. This scenic waterfall had several drifts of the typical native ferns, but near the fall itself a large wall was covered with a perfect sheet of liverwort. From all the years of pulling liverwort from my potted plants I would have never thought it could be so beautiful in the wild.

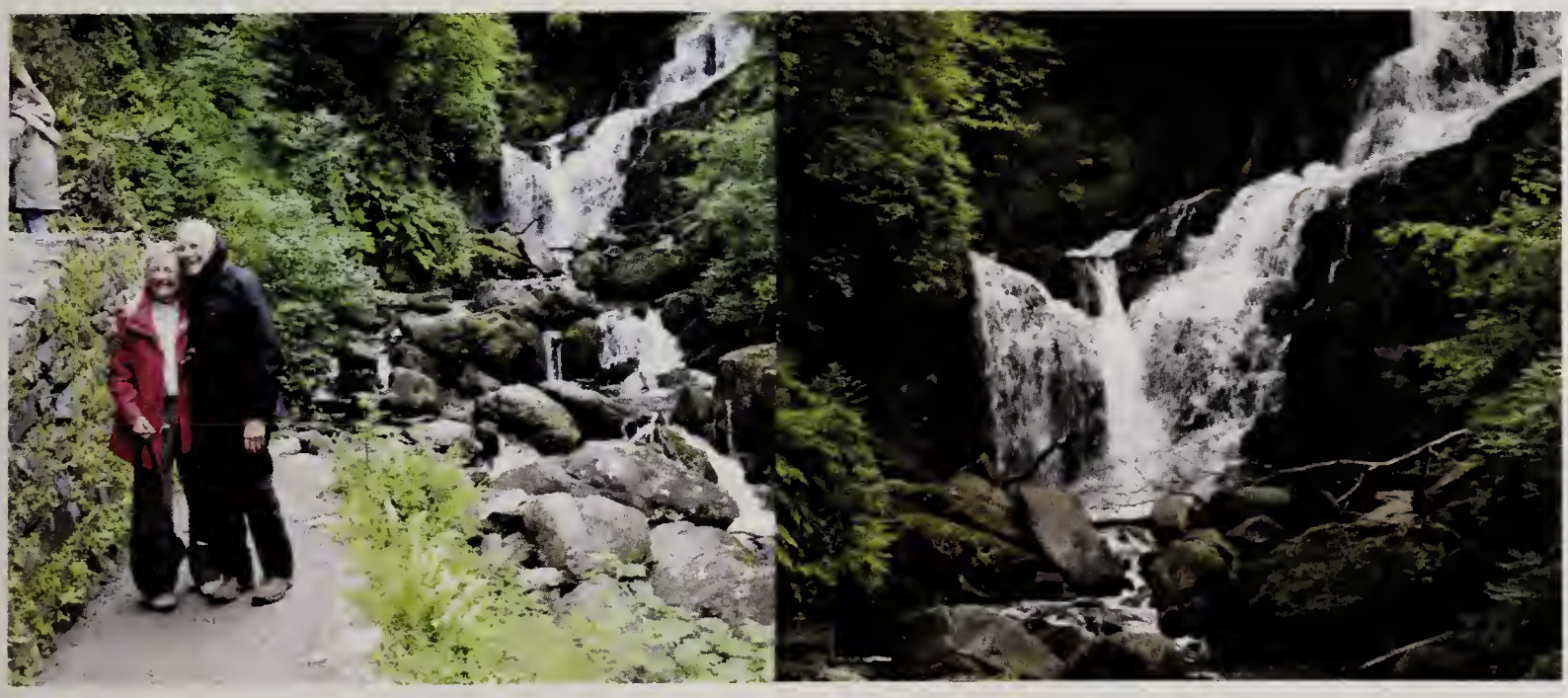


Photo above Sue Olsen and Loyd Jacobs

June 29, 2016 Wednesday – Jimi Blake and Dublin

It was a long drive today. Heading from Killarney to Dublin with a couple of stops in between. Sue was requested by her daughter to stop by their ancestral home Clonincurragh. This small village is located about half way between Limerick and Dublin. After a little diving around to try and find the location we discovered that the town is now just a field. We took some pictures, then drove to the nearby town of Mountrath for some more photos. We then continued on to my friend Jimi Blake's garden, Hunting Brook Gardens.

Jimi spoke in Seattle several years ago and it was great to have a chance to see his garden. Hunting Brook is on the south-facing flanks of the Lamb Hill in the foothills of the Wicklow mountains. It is a contemporary Irish garden with a modest timber house that he built in 2002. The garden around the house is bright, colorful and filled with rare and unusual plants. When we arrived in the early afternoon we had lunch in the house just as a heavy rain started. As the brief storm let up Jimi toured us around the beds and into the woodland. He had an interesting collection of ferns and perennials with tropicals and annuals mixed in.

The upper beds and woodland garden opened into a huge shady ravine with the namesake brook running along the bottom. Topography can make the garden and this was truly a magical space. The grassy slopes were dotted with young rare trees and exotic shrubs. Beds lined the upper paths with very choice shade loving perennials and ferns. Jimi and I traveled the length of the ravine and up the other side into a large open

meadow where he has been developing a native wildflower planting. We returned along the opposite side of the gorge on a zig-zag narrow path that wormed its way over and around rocks and fallen logs. It was a charming garden and I look forward to returning someday to see how his newly planted treasures have matured.

After Hunting Brook we drove to our Hotel in Dublin where the noted author, lecturer and most talented of gardeners, Helen Dillon, was picking us up for dinner. We got lost briefly, but arrived at the hotel about 15 minutes before Helen's arrival. It was great to see Helen again. She spoke in Seattle the year before for the annual Elisabeth C Miller Memorial Lecture, where she drew a record crowd. We quickly caught up while we were on the way to her house to pick up her husband Val. We then drove a short distance for a wonderful dinner at one of their favorite restaurants. Helen took us back and we scheduled our visit to her garden tomorrow. A long day! I went right to sleep!

June 30, 2016 Thursday – Helen Dillon's Garden, Day of Travel, Flight to Glasgow, Scotland

Helen met us at the hotel again and we followed her to her house. The Dillion Garden is very well known and it did not disappoint - it was glorious. She claimed to not have very many ferns, but what she had were excellent, several rare species and choice

cultivars. Helen's love of plants showed throughout the garden. It was rich in careful color combinations, brilliant textural arrangements and exuberant plant growth. The garden was divided up into several garden rooms. There was so much to see it was hard to take it all in. Many may know that the Dillions have sold the house and garden and

will soon move, only taking a few of the most favorite and choice plants with them. I am very excited see what Helen creates at the new house. We will be wishing them the best in this new venture.

Unfortunately, we did not have long at the garden before we had to leave to catch our plane to Glasgow, Scotland. Helen graciously and thankfully lead us to the main highway to reach the airport. It will be a day I will always remember.

We dropped off the rental car and reached the airport with little problem. There was some confusion over checking bags, but it all eventually worked out and then we boarded a shuttle bus to the part of the airport with our gate and then had a very long walk to the gate. The flight was short and uneventful, I slept most of the way.

On arriving in Glasgow, we picked up the rental car. We had to switch from the first car because it did not have a GPS. We ended up with a 4 passenger automatic BMW that was like riding on a cloud. We headed for the hotel that was near the Glasgow Botanic Garden. Arrived, unpacked and left for dinner. We had a hard time finding a place to eat due to graduation crowds from a nearby college. It started raining after dinner so we returned to the hotel in the rain. I am now soaked . . . off to bed.

July 1, 2016 Friday – Hotel work day

I stayed at the hotel today to work on the opening lecture for the British Pteridological Society's (BPS) 125th Anniversary Celebration. I was originally giving a small presentation for the organization, but just before I left the USA they asked if I would give the opening lecture after another speaker had to cancel. I only had a short time to prepare before the trip and while I was traveling so I really needed time to put the lecture together. So, I spent the day revamping and building my PowerPoint program.

Loyd and Sue went out to explore Glasgow, but only made it a few blocks to the Botanic Garden and spent the entire day there. When they returned they had scoped out a restaurant that was built in an old church and we went for dinner there. Had a great time! Back to the hotel and off to bed.

Glasgow Botanic Garden conservatory

The HFF Board extends our sincere thanks to the following members for their generous response to our appeal letter.

Adams, Brian	McCune, Amy
Albright, Anne	Michimoto, Lindsay
Anonymous	Norton, Rebecca and Craig Miller
Archer, Ralph	O'Connor, Sean
Arnold, Rance	Ogburn, Chuck
Bruce, James	Ogden, Alan
Bryan, Lydia and Joe	Olsen, Sue
Bundy, Michelle	Peters, Berndt
Burman, Beth	Pyles, Linda and Bob
Calandra, Fran	Read, J. Rosemary
Campbell, Nancy	Rice, Daniel R.
Crosby, Kathryn	Riehl, Pat
Egan, Susie and Kevin	Sanko, George
Evans, Alison	Schieber, Rose Marie and Jack
Graves, Greg	Schultz, Louise
Griesel, Judy	Sidell, Shirley
Haffner, Sue	Snyder, Larry
Heckler, Nancy	Stefanko, Dianne
Holtcamp, Veali	Steffen, Jean and Gary
Jack, Iain	Steffen, Richie
Jacobs, Loyd	Stone, Janice and Randy
Johnson, Thomas	Strahle, Nancy
Johnston, Sarah	Stritcch, Larry
Kravitz, Karin	Thompson, Diane and Paul
Kurath, Gael	van den Meerendonk
Laambert, Donna	Weiler, Marie
Lyke, Mark	Williams, Roz

Ordering Spore

This Spore Exchange is available exclusively to members of the Hardy Fern Foundation. Spore will continue to cost 50 cents per species. However, I have found that it is impossible to know the exact shipping costs until they are actually mailed. For this reason, I would like members who order spore to either request it by mail to: Carolyn Doherty, Director of the Spore Exchange, 1905 43rd St. SE, Puyallup, WA 98372. Or by email to: fernspores@hotmail.com. Please include the address where they will be sent. I will fill the order and reply by email with the exact cost of the spore, shipping, and a padded mailer if needed (75 cents) after mailing it. After the member receives this, they can pay for it by return mail at the above address or by PayPal to the Hardy Fern Foundation if it involves foreign currency. Hopefully, this will improve our system and eliminate shipping cost guessing.

Also, I would like to thank donors of spore who take the extra time to package the spore in individual packages. Please try to avoid using tape as spore sticks to it. Individual packaging saves me an enormous amount of time repackaging and labeling the spore when orders come in.

Adiantum aleuticum **'16 DOH; '16 RSF**

Adiantum aleuticum **'Subpumilum' '13 RAS; '14, '16 RSF**

Adiantum aleuticum **'Imbricatum' '12 Duryee**

Adiantum trapeziforme **'15 Beuving**

Arachniodes aff simulans **'13 EMBG**

Arachniodes davalliaeformis **'16 RSF**

Asplenium scolopendrium **'16 DOH**

Asplenium scolopendrium **'Peraferens' '16 Mandeville**

Asplenium scolopendrium **'Sagittatum' '16 Mandeville**

Asplenium scolopendrium **'Saw Blade' '15, '16 DOH**

Asplenium scolopendrium **'Undulatum' '16 Mandeville**

Asplenium trichomanes **'16 RSF**

Athyrium **sp. '13 Gassner**

Athyrium **sp. – narrow, red-stemmed '12 Gassner**

Athyrium attenuatum **'13 Gassner**

Athyrium clivicola '13 Gassner

Athyrium filix-femina 'Bornholmiense' '12 Duryee

Athyrium filix-femina 'Victoriae' '16 DOH

Athyrium otophorum '14, '16 DOH

Athyrium yokoscense '16 Gassner

Athyrium yokoscense var. *alpicola* '13 Gassner

Blechnum australe '13 Olsen

Blechnum niponicum '14 RSF; '15 Beuving

Blechnum novae-zelandiae '13 DOH, '16 EMBG

Blechnum nudum '16 EMBG

Blechnum penna-marina '16 RSF

Blechnum spicant '14 Doherty; '14, '16 RSF

Blechnum spicant 'Rickard's Serrate' '14 RSF

Blechnum tabulare '16 EMBG

Cyrtomium caryotideum '16 RSF

Cyrtomium lonchitoides '15 RSF; '15 JKL

Cyrtomium macrophyllum '14, '15 RSF

Dryopteris aemula '12 Gassner

Dryopteris affinis 'Stableri' '15, '16 RSF

Dryopteris affinis 'Stableri Crisped' '15 RSF

Dryopteris carthusiana '14 Perasso

Dryopteris cashmiriana '15 RSF

Dryopteris championii '12, '14 RSF

Dryopteris chrysocoma '13 Gassner

Dryopteris clintoniana '12 Gassner

Dryopteris corleyi '12 Gassner

Dryopteris crassirhizoma **'13, '15, 16 RSF**

Dryopteris crispifolia **'15, '16 RSF; '16 RAS**

Dryopteris cycadina **'15 RSF**

Dryopteris dickinsii **'Incisum' '16 Gassner**

Dryopteris expansa **'12 Perasso**

Dryopteris expansa **var.** *willeana* **'12 Gassner**

Dryopteris filix-mas **'15 RSF**

Dryopteris filix-mas **'Barnesii' '14 RSF**

Dryopteris filix-mas **'Parsley' '16 DOH**

Dryopteris formosana **'15 Beuving**

Dryopteris hondoensis **'16 Gassner**

Dryopteris lepidopoda **'15 RSF**

Dryopteris marginalis **'13, '16 RSF**

Dryopteris muenchii **'12 Gassner**

Dryopteris namegatae **'16 EMBG; '16 RAS**

Dryopteris pseudofilix-mas **'15 RSF**

Dryopteris pulcherrima **'16 JKL**

Dryopteris remota **'15, '16 RSF**

Dryopteris sieboldii **'13, '14, '16 RSF**

Dryopteris sublacera **'13, '15 RSF**

Dryopteris tokyoensis **'16 RSF**

Dryopteris uniformis **'Cristata' '16 JKL**

Dryopteris wallichiana **'13 RSF**

Dryopteris wallichiana **ssp.** *coriacea* **'16 EMBG**

Gymnocarpium dryopteris **'Plumosum' '16 EMBG**

Gymnocarpium fedtschenkoanum **'16 Gassner**

Matteuccia orientalis **'14 Olsen; '16 Gassner**

Onychium japonicum **'13 Olsen; '14 DOH**

Osmunda regalis **var.** *brasiliensis* **'16 RAS**

Osmunda regalis **'Decomposita' '16; RAS**

Pellaea atropurpurea **'15 Beuving**

Polypodium scouleri **'12 RSF**

Polystichum acrostichoides **'LSS Hurricane Watch' '16 EMBG**

Polystichum aculeatum **Cristata Group '13, '16 EMBG**

Polystichum braunii **'16 Gassner**

Polystichum californicum **'15 RSF**

Polystichum deltodon **'13, '16 Gassner**

Polystichum imbricans **'16 RAS**

Polystichum makinoi **'14 RSF**

Polystichum mayebarae **'13 Gassner**

Polystichum microchlamys **'15 RSF**

Polystichum munitum **'15 DOH**

Polystichum neolobatum **'14 RSF**

Polystichum rigens **'15 RSF, '16 Gassner**

Polystichum setiferum **'Lineare' '12 Olsen**

Polystichum wilsonii **'12 Gassner**

Polystichum xiphophyllum **'15 RSF**

Pteris wallichiana **'15 Beuving**

Thelypteris aurita **'16 Gassner**

Thelypteris limbosperma **'16 Gassner**

Woodsia intermedia **'15 RSF**

Woodsia polystichoides **'16 EMBG**

Woodsia subcordata **'16 EMBG**

Woodwardia unigemmata **'12 Mandeville**

Donors

Beuving – Remko Beuving, Netherlands

DOH - Carolyn Doherty, Washington, USA

Duryee - Sylvia Duryee, Washington, USA

EMBG - Elizabeth Miller Botanical Garden, Washington, USA

Gassner – Wolfram Gassner, Germany

JKL – Jo Laskowski, Washington, USA

Mandeville – Sue Mandeville, Oregon, USA

Olsen - Sue Olsen, Washington, USA

Perasso – David Perasso, Washington, USA

RAS – Richie Steffen, Washington, USA

RSF - Rhododendron Species Botanical Garden, Washington, USA

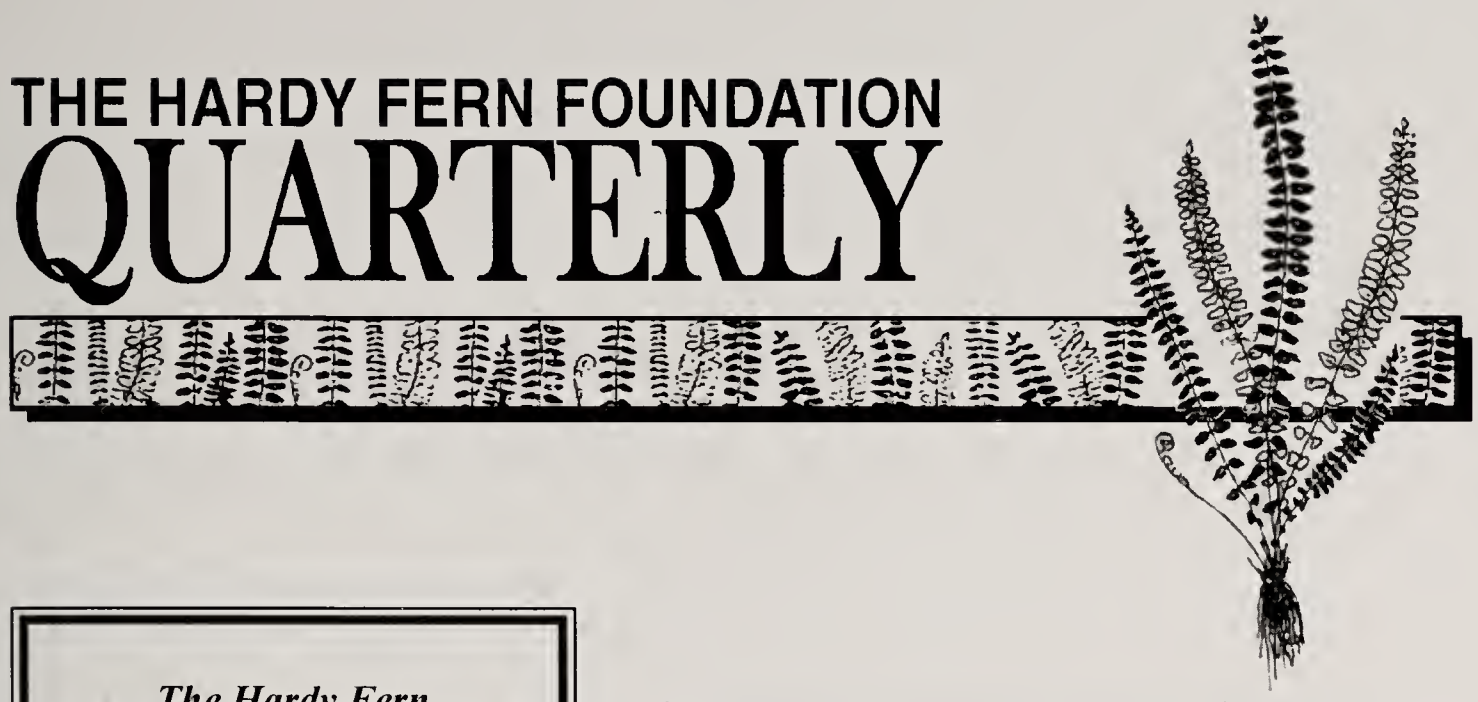
Hardy Fern Library

I know many of you are familiar with this very comprehensive and interesting source of fern knowledge (see www.hardyfernlibrary.com which is on our web site as well). It was designed by and maintained by Tom Stuart a long term member of the HFF. Unfortunately Tom has contracted Lou Gehrig's disease and feels that he needs to discontinue maintaining the site. It would be wonderful for him and for us to have it continue and I'm writing to see if any of you know of someone who is tech savvy and also has fern knowledge who might be interest in taking over from Tom. He already has an extensive and very complete data base so the primary research has already been accomplished.

Please let me know if you have any recommendations and I'll take it from there.

Thank you very much, Sue Olsen - foliageg@gmail.com

THE HARDY FERN FOUNDATION
QUARTERLY



The Hardy Fern Foundation Quarterly
is published quarterly
by the

Hardy Fern Foundation
P.O. Box 3797
Federal Way, WA
98063-3797
253-838-4646 ext. 111

Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

Please send your submissions to:

Sue Olsen
2003 128th Ave SE
Bellevue, WA 98005
foliageg@gmail.com

Editor:
Sue Olsen

Graphics:
Willanna Bradner
(cover design)
Michelle Bundy
(inside design)

Webmistress:
Michelle Bundy